

1. In a data processing system including a host device with applications being adapted for processing data in storage locations of a source device, a method for copying data from the source device to storage locations in a destination device concurrently with the operation of the at least one application in response to commands identifying the predetermined storage locations, said method comprising the steps in sequence of:

- A. responding to a first command by establishing a first operating environment including the generation of first and second lists of the predetermined storage locations in the source device) and a third list of the predetermined storage locations in the destination device,
- B. initiating a copy process that, for each predetermined storage location, includes:
 - i. copying the data from one predetermined storage location in the source device to a corresponding storage location in the destination device, and
 - ii. updating each of the lists to indicate that the data has been transferred, and
 - iii. responding to a change to a predetermined storage location in the source device by the host application for which a copy has been made, by updating each of the first, second and third

lists to denote a change to the data in the first determined location, and

- C. responding to the second command by establishing a second environment wherein the storage locations in the destination device are available for use by another host application.
- 2. A method as recited in claim 1 wherein each of said lists includes an entry describing the state of a predetermined storage location and said response to the first command includes the steps of:
 - i. initializing a precopy flag to a first state, and
 - ii. initializing each entry in the first and third lists to a first state and each entry in the second list to a second state.
 - 3. A method as recited in claim 2 wherein said response to the first command includes locking the destination device during said initialization of the lists.
 - 4. A method as recited in claim 3 wherein said response to the first command includes generating a data structure including an identification of the source and destination

devices and storing the data structure at said destination device.

5. A method as recited in claim 2 wherein said copying process operates iteratively so long as the precopy flag is in the first state.
6. A method as recited in claim 5 wherein during each iteration of said copy process said updating the corresponding entries in the lists includes the steps of:
 - i. changing the states of the corresponding entries in the first and third lists to the second state, and
 - ii. changing the state of the corresponding entry in the second list to the first state whereby said first and second lists indicate that the data in the corresponding storage location has been transferred to the destination device.
7. A method as recited in claim 6 wherein the one host application generates a request to write data to a storage location in the source device, said method including the steps of responding to the request by:

- i. testing the entry in the second list for corresponding storage location,
 - ii. when the entry is in the first state, transferring the data to the destination device, and
 - iii. when the entry is in the second state, transferring the data to the destination device, shifting the states corresponding entries in the first and third lists to the second state and shifting the state of the corresponding entry in the second list to the first state.
- 8. A method as recited in claim 5 response to the second command includes:
 - i. shifting the precopy flag to a second state,
 - ii. initializing an active copy flag to a first state, and
 - iii. initiating the operation of an iterative active copy process.
- 9. A method as recited in claim 8 wherein each iteration of said active copy process includes the steps of:
 - i. identifying a storage location, and

ii. testing the state of the entry in the second list corresponding to the identified storage location.

10. A method as recited in claim 9 wherein said active copy process includes:

i. when the entry is in the first state, the step of shifting the entry to the second state, and

ii. when the entry is in the second state, the step of copying the data to the destination device when testing of the state of the corresponding entry indicates that such copying is required.

11. A method for copying data from storage locations in a source device to storage locations in a destination device comprising the steps in sequence of:

A. responding to a first command by establishing a first operating environment including the generation of first and second lists of the predetermined storage locations in the source device) and a third list of the predetermined storage locations in the destination device,

B. initiating a copy process that, for each predetermined storage location, includes:

- i. copying the data from one predetermined storage location in the source device to a corresponding storage location in the destination device, and
 - ii. updating each of the lists to indicate that the data has been transferred, and
 - iii. responding to a change to a predetermined storage location in the source device for which a copy has been made, by updating each of the first, second and third lists to denote a change to the data in the first determined location, and
 - C. responding to the second command by establishing a second environment wherein the storage locations in the destination device are available for use by another host application.
12. A method as recited in claim 11 wherein each of said lists includes an entry describing the state of a predetermined storage location and said response to the first command includes the steps of:
- i. initializing a precopy flag to a first state, and

- ii. initializing each entry in the first and third lists to a first state and each entry in the second list to a second state.
- 13. A method as recited in claim 12 wherein said response to the first command includes locking the destination device during said initialization of the lists.
- 14. A method as recited in claim 13 wherein said response to the first command includes generating a data structure including an identification of the source and destination devices and storing the data structure at said destination device.
- 15. A method as recited in claim 12 wherein said copying process operates iteratively so long as the precopy flag is in the first state.
- 16. A method as recited in claim 15 wherein during each iteration of said copy process said updating the corresponding entries in the lists includes the steps of:
 - i. changing the states of the corresponding entries in the first and third lists to the second state, and

- ii. changing the state of the corresponding entry in the second list to the first state whereby said first and second lists indicate that the data in the corresponding storage location has been transferred to the destination device.
17. A method as recited in claim 16 wherein the source device receives a write request to write data to a storage location in the source device, said method including the steps of responding to the request by:
- i. testing the entry in the second list for corresponding storage location,
 - ii. when the entry is in the first state, transferring the data to the destination device, and
 - iii. when the entry is in the second state, transferring the data to the destination device, shifting the states corresponding entries in the first and third lists to the second state and shifting the state of the corresponding entry in the second list to the first state.
18. A method as recited in claim 15 response to the second command includes:

- i. shifting the precopy flag to a second state,
 - ii. initializing an active copy flag to a first state, and
 - iii. initiating the operation of an iterative active copy process.
- 19. A method as recited in claim 18 wherein each iteration of said active copy process includes the steps of:
 - i. identifying a storage location, and
 - ii. testing the state of the entry in the second list corresponding to the identified storage location.
- 20. A method as recited in claim 19 wherein said active copy process includes:
 - i. when the entry is in the first state, the step of shifting the entry to the second state, and
 - ii. when the entry is in the second state, the step of copying the data to the destination device when testing of the state of the corresponding entry indicates that such copying is required.
- 21. In a data processing system including a host device with applications being adapted for processing data stored in data tracks of a source device, a method for copying data from the

source device data tracks to data tracks in a destination device concurrently with the operation of the at least one application in response to commands from a host application identifying the predetermined storage locations, said method comprising the steps in sequence of:

- A. responding to a first command by establishing a first operating environment including the generation of first and second sets of bits wherein each bit, in a set position corresponds to a data track in the source device and a third set of bits with each bit position corresponding to a data track in the destination device,
- B. initiating a copy process that, for each predetermined storage location, includes:
 - i. copying the data from one data track in the source device to a corresponding data track in the destination device, and
 - ii. updating the corresponding bit positions in each of the bit sets to indicate that the data has been transferred, and
 - iii. responding to a change to a track in the source device by the host application for which a copy has been made, updating the corresponding bit positions in each of the first, second and third

bit sets to denote a change to the data in the first determined location, and

B. responding to the second command by establishing a second environment wherein the data tracks in the destination device are available for use by another host application.

22. A method as recited in claim 21 wherein each of said bit sets includes an entry describing the state of a predetermined data track and said response to the first command includes the steps of:

- i. initializing a precopy flag to a first state, and
- ii. setting each bit position in the first and third bit sets and clearing each bit position in the second bit set.

23. A method as recited in claim 22 wherein said response to the first command includes locking the destination device during said initialization of the bit sets.

24. A method as recited in claim 23 wherein said response to the first command includes generating a data structure including an identification of the source and destination

devices and storing the data structure at said destination device.

25. A method as recited in claim 22 wherein said copying process operates iteratively so long as the precopy flag is in the first state.
26. A method as recited in claim 5 wherein during each iteration of said copy process said updating the corresponding bit positions in the bit sets includes the steps of:
 - i. clearing of the corresponding bit positions in the first and third bit sets, and
 - ii. setting the corresponding bit position in the second bit set thereby to indicate that the data in the corresponding data track has been transferred to the destination device.
27. A method as recited in claim 26 wherein the one host application generates a request to write data to a data track in the source device, said method including the steps of responding to the request by:
 - i. testing the corresponding bit position in the second bit set;

- ii. when the corresponding bit is set, transferring the data to the destination device, and
 - iii. when the corresponding bit is cleared, transferring the data to the destination device, clearing the corresponding positions in the first and third bit sets and setting the corresponding bit position in second bit set.
28. A method as recited in claim 25 response to the second command includes:
- i. clearing the precopy flag,
 - ii. setting an active copy flag, and
 - iii. initiating the operation of an iterative active copy process.
29. A method as recited in claim 28 wherein each iteration of said active copy process includes the steps of:
- i. identifying a data track, and
 - ii. testing the corresponding bit position in the second bit set.
30. A method as recited in claim 29 wherein said active copy process includes:

- i. when the corresponding bit position is set,
clearing the bit position, and
- ii. when the corresponding bit position is cleared,
copying the data to the destination device.